

is near the limit of the range of this species, and the latter does not go much farther up stream. All of the species are rather small, which is most striking in *Lampsilis recta*, which actually is represented by a dwarf race.

All the species have been found alive, except *Quadrula undulata*.

DUNKARD CREEK (collections made on July 8 and 9, 1908).

- |   |   |
|---|---|
| 1. <i>Lampsilis ventricosa</i> (Barn.).         | 8. <i>Strophitus undulatus</i> (Say).   |
| 2. <i>Lampsilis luteola</i> (Lam.).             | 9. <i>Anodonta grandis</i> (Say).       |
| 3. <i>Lampsilis recta</i> (Lam.).               | 10. <i>Symphynota costata</i> (Raf.).   |
| 4. <i>Lampsilis iris</i> (Lea).                 | 11. <i>Unio gibbosus</i> (Barn.).       |
| 5. <i>Proptera aluta</i> (Say).                 | 12. <i>Quadrula rubiginosa</i> (Lea).   |
| 6. <i>Tritogonia tuberculata</i> (Barn.).       | 13. <i>Quadrula tuberculata</i> (Raf.). |
| 7. <i>Ptychobranchus phaseolus</i><br>(Hildr.). |   |

Of these, only *Lampsilis luteola* and *Anodonta grandis* were found alive: the condition of the creek was not favorable for collecting (first and second day after a heavy thundershower). It is probable, that the fauna is not complete, and I cannot say anything about the frequency of the single species.

---

#### VARIATION.

BY REV. HENRY W. WINKLEY.

---

First, nature never makes two individuals exactly alike; secondly environment. One hundred shells of the same species from a given locality will show individuality. Compared with a group of the same species from another region there is another difference. Like the difference between races of the human family, this is undoubtedly due to environment. At Eastport, Maine, where the Bay of Fundy tides create strong currents, chitons, limpets and other forms are in profusion and attain unusually large size. These may be called sedentary forms and depend on food being brought to them. A few feet away *Buccinum* is abundant but small. The same is true of *Lunatia heros* found in neighboring waters. These are carnivorous forms and are much larger at Casco Bay and its neighborhood.

*Haminea solitaria* is a white shell. A small colony from the

Branford River has every individual a deep brown. I wonder if this is due to the presence of a large iron foundry a short distance away. Erosion is not a characteristic, yet it does result from environment. This is conspicuous where unios are taken from waters where there is decaying vegetation. The reason is well known; acid from decaying leaves acts on the lime of the shell. The same effect may be seen in marine shells taken from waters where a river meets the sea. An interesting effect of air may be seen in the author's cabinet. Shells of *Fusus decemcostatus* taken below low tide are well preserved even to the apex; others from a few yards away, exposed to the air at low tide, are much eroded.

Pure white sets of *Gemma gemma* may be found at Woods Hole and Branford, Conn. At Provincetown they are a very dark purple, some specimens showing hardly a trace of white. At Revere Beach the type is white with perhaps a third of the shell faintly tinted purple. Reasons for this variation I cannot give. Nor can I explain why sets found a dozen years ago at Revere Beach should vary from specimens obtained at the same spot a year ago.

*Litorinella minuta* is abundant in pot holes in the marshes. Environment there is good for it. A dwarfed variety is found in the Branford River, and the same form occurs on dead eel grass under the wharves at Provincetown. Evidently this form flourishes better in still water. Temperature has its influence. *Planorbis trivolvis* occurs throughout New England. It is small in the Connecticut River at Springfield, the same at Branford and eastern Massachusetts. In northern Maine large, and the largest and finest set in the author's cabinet was obtained at Dalton, Mass., in the Berkshire hills. This last region is well known as having northern insects, undoubtedly the other species of shells would show affinity with the forms in northern New England. Climate alone explains this variation. The forms from the Connecticut River certainly have water enough, but they are small. Other sets are from small bodies of water; only in colder regions does this giant thrive.

Environment drives out some species and retains others. These few examples are variations in the same species which shows the effects of different surroundings.